

Remarks/Arguments

The Examiner is thanked for the careful review of this application. Claims 1, 3-16, and 21-25 are pending after entry of the present Amendment. Claims 2 and 17-20 were previously cancelled. Amendments were made to claims to better define the invention. No new subject matter has been introduced.

Rejections under 35 U.S.C. § 103:

The Office has maintained rejection of claims 1, 3-16, and 21-25 under U.S.C. 103(a) over the combination of the prior art. Applicants respectfully traverse the Office's rejections for the reasons stated below as well as Applicants' arguments provided in previous responses to the Office Actions, all of which are herein incorporated by reference in their entirety.

It is submitted that Nguyen does not teach that the second etch process has a "high" selectivity for silicon nitride over silicon dioxide. Rather, Nguyen teaches that the second etching process has a 2:1 selectivity ratio (silicon nitride with respect to silicon dioxide). It is submitted that the 2:1 selectivity ratio is not considered to be a high selectivity ratio by one of ordinary skill in the art. An skilled artisan in the art of semiconductor fabrication and etching, recognizes the selectivity of approximately 8:1 to approximately 10:1 to be a high selectivity, and not the 2:1 selectivity.

Nguyen confirms such recognition. Nguyen teaches that 2:1 selectivity ratio is beneficial in situations where a process layer (a sacrificial layer) is formed between the substrate and the silicon nitride layer. In other words, the selectivity ratio selected by Nguyen is low, thus allowing the process layer to be etched providing a margin of error for stopping the etch process before etching the substrate surface. Comparatively, Nguyen uses a selectivity ratio of 10:1 when etching silicon dioxide with respect to the silicon, as Nguyen disfavors etching into the silicon substrate (a sacrificial layer does not exist). By

implementing a high selectivity ratio (10:1), Nguyen takes the necessary precautions so that etching through the silicon substrate does not occur or is minimal. Accordingly, Nguyen does not teach or disclose using an etchant gas that has high selectivity toward the silicon nitride layer. As none of the remaining cited prior art teaches or suggests using a second etchant gas that has a high selectivity toward silicon nitride, each and every combination of the prior art fails to teach or suggest implementing a second etchant gas that has a high selectivity toward the silicon nitride.

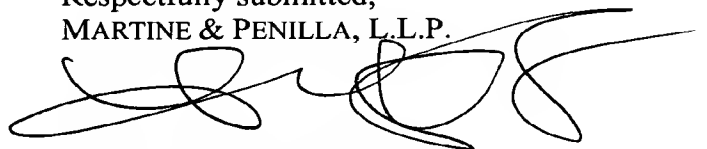
Furthermore, although Armacost discloses the probability of using the etchant composition C_2F_6 , CH_2F_2 , and O_2 , the etchant gas disclosed in Armacost has a high selectivity toward photoresist or oxide formed over the silicon nitride spacer layer. Thus, Armacost discloses using compositions that are not highly selective toward the silicon nitride, as defined in the claimed invention. In fact, the teachings of Armacost in this point are almost opposite of the claimed invention. Thus, while the same composition of gases may have been suggested by Armacost, the combinations used in the claimed invention is selected such that the second etchant gas has a high selectivity toward nitride that is the spacer layer, whereas the compositions as selected in Armacost are selected to have high selectivity toward oxide or photoresist.

Furthermore, it must be noted that Nguyen teaches using etching recipes wherein both the first etchant gas and the second etchant gas include He while Chiu specifically teaches that the first etchant gas and the second etchant gas preferably employ a chlorine containing etchant gas composition. It is submitted that one of ordinary skill in the art reading Nguyen or Chiu, would not have disregarded the explicit teachings of using the He or Chlorine so as to arrive at the first and second etchant gas of the claimed invention. It must further be noted that the composition of choice in Armacost (i.e., C_2F_6 , CH_3F , and CO) is not the etchant compositions claimed in the subject application.

Therefore, it is respectfully submitted that independent claims 1, 6, 7, and 21-25 are patentable under 35 U.S.C. § 103(a) over any combination of the cited prior art. In a like manner, dependent claims 3-5 and 8-16 which incorporate each and every element of the applicable independent claim are patentable under 35 U.S.C. § 103(a) over any combination of the cited prior art for at least the same reasons discussed above.

In view of the foregoing, Applicants respectfully submit that all of the pending claims 1, 3-16, and 21-25 are in condition for allowance. Accordingly, a Notice of Allowance is respectfully requested. If the Examiner has any questions concerning the present Amendment, the Examiner is kindly requested to contact the undersigned at (408) 749-6900, ext. 6913. If any additional fees are due in connection with filing this Amendment, the Commissioner is also authorized to charge Deposit Account No. 50-0805 (Order No. LAM2P295). A duplicate copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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